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PREFENDARY OF LICHFIELD, AND HEAD MASTER OF SHERWSBURY SCHOOL.

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MERCANTILE EXERCISES

IN

ADDITION OF MONEY

AND IN

THE CALCULATION OF PER-CENTAGES.

INCLUDING NUMEROUS EXAMPLES OF A
GENERAL AND SIMPLE METHOD OF TREATING PER-CENTAGE
PROBLEMS, WITH ANSWERS TO ALL THE EXERCISES: ADAPTED TO THE
REQUIREMENTS OF SCHOOLS, AND OF THE CIVIL SERVICE
AND OTHER PUBLIC EXAMINATIONS.

BY THE

REV. JOHN HUNTER, M.A.

Instructor of Candidates for the Civil Service
and other Public Examinations.

LONDON:

LONGMAN, GREEN, LONGMAN, ROBERTS, & GREEN.

1865.

LONDON
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NEW-STREET SQUARE



PREFACE.

THE publication of this little manual is the result of a conviction that in a course of training for clerkships in government offices, mercantile houses, &c., there is wanted a means of attaining a more thorough mastery of the general principles of per-centage calculation, and a more ready power of totalling long columns of money, than any of the published treatises on Arithmetic are fitted to impart. The instructions and exercises here supplied will, therefore, it is hoped, form a useful supplement to the ordinary arithmetical work in schools, and give beneficial help to candidates preparing for any of the various public examinations in which Addition of Money forms the subject of a special paper in arithmetic, and in which Problems in Per-centages form a prominent feature of the miscellaneous paper.

The Exercises in Addition of Money will supply good practice for a class in school, if, while the teacher stands ready to write the total result on the black board, the members of the class in succession, each

with book in hand, call out the sums as they arise in the process of adding. In this procedure, the first Exercise should be treated as follows:—In the addition of the farthings column, let the boys, successively, say 3, 5, 8, 11, &c., to 36, no farthings, carry 9*d.*; then, for the pence column, 17, 26, 36, 43, &c., where it will be observed that two figures whose sum does not exceed 10 may be taken together. All the other Exercises may be treated in this way.

In the practice of a student performing the whole addition by himself, the same manner of adding may be employed; and he should endeavour to attain such expertness as to be able to do at least six of the Exercises correctly in a quarter of an hour.

MERCANTILE EXERCISES.



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	134	6	6		8204	15	2½
	232	1	11¼		211	6	8
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	9416	9	8½		14376	15	10¼
	28731	2	5½		2371	11	9
	1279	8	7¾		21309	5	8¾
	4610	3	2¼		1528	3	6
	752	15	3½		6408	13	10½
	7187	10	3½		8411	1	5¼
	9312	8	5½		5298	4	9
	13257	8	11½		23198	2	7
	3276	5	9¼		631	7	7¼
	46	3	6¾		691	13	9½
	1287	14	7½		1414	12	4
	4917	10	8		5016	18	2
	147	0	6¾		8756	14	9½
	360	5	5		56	4	10¾
	1379	17	2¾		616	3	7½
	9	9	10½		1189	2	3¾
	1340	16	9¼		401	3	6½
	906	10	7½		7116	15	7¾
	2222	5	1		917	18	8

	£	s.	d.
(3)	25673	14	10
	2567	13	6
	9536	0	8 $\frac{3}{4}$
	16859	6	11 $\frac{1}{2}$
	764	9	9
	1900	3	4 $\frac{3}{4}$
	28185	17	6
	1647	5	8 $\frac{3}{4}$
	698	10	10 $\frac{1}{2}$
	3755	8	2
	80	15	5

	£	s.	d.
	1765	3	11 $\frac{1}{2}$
	12708	14	7 $\frac{1}{4}$
	593	18	3
	49	9	10
	3074	1	9 $\frac{1}{4}$
	22634	15	0
	318	7	6 $\frac{1}{2}$
	9852	4	10
	6185	0	10 $\frac{1}{2}$
	33967	16	0
	3396	5	9

(4)	7319	2	5 $\frac{3}{4}$
	1211	6	7 $\frac{1}{2}$
	3144	18	9 $\frac{1}{2}$
	2376	0	9 $\frac{1}{2}$
	163	9	11 $\frac{1}{2}$
	12345	7	4
	4610	7	8 $\frac{3}{4}$
	109	19	10
	4321	18	9 $\frac{1}{2}$
	38925	7	3 $\frac{1}{4}$
	8411	1	5
	1528	3	6 $\frac{1}{2}$
	6418	1	7 $\frac{1}{4}$
	1140	15	6 $\frac{3}{4}$
	6678	13	9 $\frac{3}{4}$
	3198	10	8
	5618	15	5 $\frac{1}{2}$
	25976	2	5
	6549	3	3 $\frac{3}{4}$
	7530	4	4 $\frac{1}{2}$
	5811	5	5 $\frac{3}{4}$
	756	2	2 $\frac{1}{2}$
	76	11	10

(5)	23705	12	3 $\frac{1}{4}$
	56390	9	11 $\frac{1}{2}$
	7657	6	6
	4346	17	10 $\frac{3}{4}$
	8843	5	9 $\frac{1}{2}$
	12579	10	7
	365	17	6
	3322	4	11 $\frac{1}{4}$
	30919	8	11
	640	10	10 $\frac{1}{2}$
	757	3	5 $\frac{1}{2}$
	1686	19	2
	25428	8	6 $\frac{1}{2}$
	18076	7	11
	5623	2	8 $\frac{1}{4}$
	505	13	0 $\frac{1}{2}$
	15882	0	10 $\frac{3}{4}$
	94	16	0
	1728	11	6
	949	3	8
	17701	4	4
	939	14	6
	320	14	9

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3

	£	s.	d.
(6)	2784	1	11½
	12870	12	5
	489	6	0¾
	557	13	10¾
	88	9	6
	7666	5	9
	5946	19	7½
	28095	9	2
	643	6	8¾
	6029	0	10¾
	629	17	10¾

	£	s.	d.
	39798	14	11
	4603	15	8
	3297	5	7¾
	1936	6	4
	557	0	4
	21809	16	10½
	91	11	9½
	6465	2	6
	749	12	6
	5432	7	7¼
	30284	8	7½

(7)	563	14	0
	6537	8	8¼
	4978	15	10¼
	36650	16	7½
	829	9	9
	19446	3	8¾
	7383	13	11¾
	91	19	9
	764	7	6½
	3008	5	0½
	23456	12	11¼
	2581	14	7½
	6995	17	4
	7895	7	11½
	4898	6	0
	25677	0	0
	144	12	10½
	301	18	5¾
	8008	9	6
	999	19	11¾
	6565	4	4
	3183	0	10
	328	18	6

(8)	12345	17	6
	6789	10	11
	45678	9	10½
	379	12	4
	793	15	9½
	836	14	9¼
	1234	5	6
	30560	0	0
	473	3	8½
	612	12	10
	23456	7	8¾
	27689	6	0½
	4567	18	8¾
	9876	5	4
	368	15	4½
	1000	0	0
	745	10	9½
	989	9	9¾
	632	8	11¾
	657	13	7½
	848	13	6
	3579	11	1
	358	6	8¾

	£	s.	d.
(9)	35079	18	10 $\frac{1}{4}$
	265	7	8 $\frac{3}{4}$
	2275	3	10 $\frac{1}{2}$
	958	13	6 $\frac{3}{4}$
	9	17	6
	259	5	7
	17096	9	5 $\frac{1}{2}$
	8544	2	8
	675	10	11
	10947	19	4 $\frac{1}{4}$
	1094	7	9

	£	s.	d.
	5460	0	3
	46	13	2 $\frac{1}{2}$
	549	8	10 $\frac{1}{2}$
	23678	10	10 $\frac{1}{2}$
	6945	9	8
	33459	6	6 $\frac{3}{4}$
	7744	15	11 $\frac{1}{2}$
	846	7	5
	873	5	6
	3319	10	7
	12345	6	8

(10)	7968	3	3
	9786	15	6 $\frac{1}{2}$
	19549	13	11
	88	18	9
	375	17	4
	398	9	10 $\frac{3}{4}$
	6863	14	5 $\frac{1}{4}$
	7854	6	3 $\frac{1}{2}$
	18600	10	0
	999	15	7
	3456	15	6
	365	8	2 $\frac{1}{2}$
	7854	12	7 $\frac{1}{4}$
	201	9	5
	9678	7	11
	9687	2	11
	5043	6	8
	7384	16	8 $\frac{1}{2}$
	7797	0	10 $\frac{1}{2}$
	144	4	4
	222	9	6
	9873	19	6
	9068	3	6

(11)	9876	10	10 $\frac{1}{2}$
	854	12	10 $\frac{1}{2}$
	38765	12	8
	987	17	8 $\frac{1}{2}$
	659	3	8 $\frac{3}{4}$
	7869	13	11 $\frac{1}{2}$
	30699	5	0 $\frac{3}{4}$
	35569	6	0 $\frac{1}{2}$
	27879	0	8
	33085	19	9
	6544	7	6
	8329	17	6
	7580	3	3 $\frac{3}{4}$
	29868	15	0
	14426	9	10 $\frac{3}{4}$
	52989	1	8 $\frac{1}{2}$
	30799	4	4 $\frac{1}{2}$
	167	11	9 $\frac{1}{2}$
	567	10	9 $\frac{3}{4}$
	7854	7	5
	15937	0	0
	606	18	11 $\frac{1}{4}$
	623	5	10

	£	s.	d.
(12)	29292	16	7 $\frac{1}{4}$
	4786	9	2
	656	15	11 $\frac{1}{2}$
	79	10	8 $\frac{3}{4}$
	58373	17	2 $\frac{1}{2}$
	365	5	6
	787	13	10 $\frac{1}{4}$
	6534	6	9
	6498	18	5 $\frac{3}{4}$
	16399	4	7
	6853	12	7 $\frac{3}{4}$

	£	s.	d.
	31830	18	11 $\frac{3}{4}$
	6975	1	6
	5409	11	5 $\frac{1}{2}$
	20599	14	1 $\frac{1}{2}$
	640	2	6
	1758	7	8
	1864	6	2 $\frac{1}{4}$
	11336	10	7 $\frac{1}{4}$
	254	8	9
	784	6	8 $\frac{1}{4}$
	6095	3	8 $\frac{1}{2}$

(13)	760	16	10
	9785	4	9
	96	12	9
	365	13	7
	26365	8	7
	839	0	6 $\frac{3}{4}$
	8390	5	4
	786	8	10 $\frac{1}{2}$
	98	14	8 $\frac{3}{4}$
	198	15	2 $\frac{1}{2}$
	7854	6	11
	30009	7	10
	9	18	5 $\frac{3}{4}$
	23	10	4 $\frac{1}{2}$
	973	1	3
	5796	11	3 $\frac{3}{4}$
	794	3	6
	566	2	11 $\frac{1}{2}$
	17409	4	3
	2345	6	7
	3456	7	8
	4567	8	9
	5678	9	10

(14)	8759	11	11
	875	6	0 $\frac{1}{2}$
	975	10	6 $\frac{3}{4}$
	628	14	4 $\frac{3}{4}$
	617	15	9 $\frac{3}{4}$
	15151	8	11 $\frac{1}{2}$
	6947	18	1 $\frac{1}{4}$
	694	7	10 $\frac{1}{4}$
	79	8	11 $\frac{1}{2}$
	3000	0	0
	23099	11	6
	24186	5	8
	24875	4	6
	762	12	7 $\frac{1}{2}$
	968	3	11
	8510	10	0
	9583	10	9 $\frac{3}{4}$
	5184	9	9 $\frac{1}{4}$
	16732	16	7
	1673	2	6
	7854	12	6
	945	7	6
	987	5	10 $\frac{1}{4}$

	£	s.	d.
(15)	10096	10	6 $\frac{1}{2}$
	9998	13	11
	876	13	2 $\frac{1}{4}$
	786	5	9 $\frac{1}{2}$
	6565	15	8 $\frac{3}{4}$
	40665	8	7 $\frac{1}{2}$
	4066	5	8
	18797	15	10
	840	9	10 $\frac{1}{2}$
	878	19	4 $\frac{3}{4}$
	88	6	5

	£	s.	d.
	34567	8	9
	8040	12	10 $\frac{1}{4}$
	45678	9	10
	456	9	9 $\frac{1}{2}$
	9109	11	6
	7363	7	5 $\frac{1}{4}$
	11	10	11
	6834	17	11 $\frac{1}{2}$
	565	6	1 $\frac{1}{2}$
	793	16	1 $\frac{3}{4}$
	844	19	8

(16)	59	15	7 $\frac{1}{4}$
	3079	15	10 $\frac{1}{4}$
	978	3	10 $\frac{3}{4}$
	10	10	7 $\frac{3}{4}$
	865	8	6 $\frac{3}{4}$
	44363	19	11 $\frac{3}{4}$
	40630	9	5
	4436	9	6 $\frac{3}{4}$
	87	6	1
	97	9	2 $\frac{1}{2}$
	55	12	9
	108	13	8 $\frac{1}{2}$
	365	4	9
	8289	17	4 $\frac{3}{4}$
	20204	7	10
	977	4	2 $\frac{3}{4}$
	698	0	10 $\frac{1}{2}$
	6980	10	3
	1234	5	6 $\frac{1}{2}$
	2345	6	7
	17989	11	11 $\frac{3}{4}$
	18608	5	3 $\frac{3}{4}$
	596	8	1

(17)	8826	11	11 $\frac{1}{2}$
	882	12	2 $\frac{3}{4}$
	7589	12	3 $\frac{3}{4}$
	16959	8	10 $\frac{1}{2}$
	3658	18	6 $\frac{1}{2}$
	3090	18	10 $\frac{1}{2}$
	38699	17	5 $\frac{1}{4}$
	17784	0	6
	19564	0	8
	15875	19	4 $\frac{1}{4}$
	14040	9	11 $\frac{1}{2}$
	965	7	9 $\frac{3}{4}$
	768	17	7 $\frac{1}{2}$
	22522	6	8 $\frac{3}{4}$
	789	10	0 $\frac{3}{4}$
	679	8	4 $\frac{1}{2}$
	8901	1	10 $\frac{1}{2}$
	18493	11	6 $\frac{1}{2}$
	6754	11	8
	858	6	10
	68	2	7 $\frac{1}{2}$
	1010	15	8
	2379	5	8 $\frac{1}{4}$

ADDITION OF MONEY.

7

	£	s.	d.
(18)	25339	8	5
	6954	17	7½
	25607	18	4¼
	9201	13	5½
	3808	9	0
	25095	6	11
	478	3	9½
	487	10	10
	6674	0	10
	878	15	2¾
	6889	10	7

	£	s.	d.
	4188	11	11½
	8814	17	9
	675	8	9¾
	13579	9	6
	10866	9	7
	5940	0	3¾
	20080	12	10
	96	9	8
	197	19	8
	358	4	4½
	763	6	11

(19)	3784	13	0
	37564	19	0
	2673	6	8¼
	346	10	11½
	649	7	11½
	1865	7	6½
	5963	0	9½
	998	8	7
	18099	5	8¾
	7657	13	10
	786	13	5¾
	78	3	6½
	89	10	0
	49	1	10
	5656	11	3¼
	23456	7	8
	9704	4	8
	899	9	9
	6520	0	0
	9845	6	2½
	13579	11	10
	25814	17	0
	36925	18	9

(20)	3756	9	4
	32756	19	6¼
	6573	2	6
	4306	12	10¼
	18168	5	8½
	2227	1	5½
	17395	12	2
	5880	4	9¼
	18529	13	6
	432	6	9
	19754	6	7¾
	7854	0	0
	31416	11	11
	5236	17	1½
	30013	8	2
	6677	10	11
	28965	18	6
	543	3	8
	10854	14	6
	629	1	1
	4587	7	10
	5874	10	7
	9876	5	4

	£	s.	d.
(21)	6851	13	6 $\frac{1}{2}$
	15398	14	7 $\frac{3}{4}$
	2345	6	7
	8910	11	0
	9876	5	4 $\frac{3}{4}$
	1514	13	11 $\frac{1}{2}$
	29630	7	2 $\frac{1}{4}$
	8147	0	10
	37986	9	8 $\frac{1}{2}$
	4795	16	6
	13708	6	10

	£	s.	d.
	24790	15	11 $\frac{3}{4}$
	5857	6	9 $\frac{3}{4}$
	365	8	5
	8658	5	4 $\frac{1}{2}$
	19494	14	8
	696	12	10 $\frac{1}{4}$
	987	19	11
	998	19	10
	889	17	11 $\frac{1}{2}$
	675	6	8 $\frac{3}{4}$
	2356	9	1

(22)	14376	12	10 $\frac{1}{4}$
	24361	7	6
	563	16	9
	478	10	7 $\frac{1}{2}$
	3456	7	8 $\frac{1}{2}$
	611	0	11 $\frac{3}{4}$
	9990	19	0
	28759	3	2 $\frac{1}{2}$
	6784	9	11
	7038	8	5 $\frac{3}{4}$
	867	15	10
	5976	6	9
	34567	8	9
	110	12	7 $\frac{1}{2}$
	5678	5	6 $\frac{1}{2}$
	8789	4	4 $\frac{3}{4}$
	10095	18	8
	6802	14	6
	867	2	1 $\frac{3}{4}$
	7558	2	3
	9479	6	11
	5909	13	7
	8796	5	7

(23)	6090	7	7 $\frac{1}{2}$
	8695	14	8
	9584	16	10
	34608	9	4 $\frac{1}{2}$
	467	9	5 $\frac{3}{4}$
	10234	17	6 $\frac{1}{2}$
	1865	1	0
	7854	19	11 $\frac{1}{4}$
	8979	5	10
	25025	11	8 $\frac{1}{4}$
	7654	2	6
	869	0	0
	769	0	8
	536	18	5
	365	18	10 $\frac{3}{4}$
	4567	16	7
	8901	13	3 $\frac{3}{4}$
	2345	0	0
	6789	0	0
	8976	4	9
	7588	9	4
	7858	7	6 $\frac{1}{2}$
	19037	8	6 $\frac{1}{2}$

	£	s.	d.
(24)	387	17	11
	4879	17	3 $\frac{3}{4}$
	15640	2	2 $\frac{3}{4}$
	9786	15	9 $\frac{1}{2}$
	598	13	6
	27272	3	6
	938	3	10 $\frac{1}{2}$
	29398	19	5 $\frac{1}{2}$
	11607	7	6
	3496	6	8
	6875	14	10

	£	s.	d.
	24073	13	10 $\frac{1}{4}$
	14974	14	11 $\frac{1}{2}$
	36345	15	2
	18798	6	9
	9466	18	3 $\frac{3}{4}$
	7691	5	4 $\frac{1}{4}$
	5587	8	3 $\frac{1}{4}$
	14902	11	5
	16549	16	0 $\frac{1}{2}$
	28059	9	7
	7854	17	9

(25)	44563	4	6 $\frac{1}{2}$
	635	0	0
	3879	10	11
	567	18	9
	37488	6	6 $\frac{1}{4}$
	2156	12	10 $\frac{1}{4}$
	9854	19	7 $\frac{1}{2}$
	7769	15	8 $\frac{3}{4}$
	8637	18	9 $\frac{3}{4}$
	5869	13	2 $\frac{3}{4}$
	75	14	11 $\frac{1}{2}$
	785	16	6 $\frac{3}{4}$
	8964	17	3 $\frac{3}{4}$
	23679	6	9
	8987	7	10
	4554	9	8
	7633	11	8
	1864	5	6
	28796	8	2 $\frac{3}{4}$
	10483	6	0
	19753	19	11
	32625	9	11
	367	13	8

(26)	5146	11	0
	20010	10	0
	59937	7	4 $\frac{1}{4}$
	1819	4	1 $\frac{1}{2}$
	275	13	1 $\frac{3}{4}$
	22678	9	11 $\frac{3}{4}$
	13597	2	7
	7953	15	9
	14715	18	6
	5678	9	10 $\frac{1}{2}$
	249	9	9 $\frac{1}{2}$
	12496	6	8 $\frac{3}{4}$
	8758	16	5
	6789	17	9 $\frac{1}{2}$
	9898	5	8
	17034	19	8
	37935	4	10 $\frac{1}{2}$
	8642	11	10 $\frac{3}{4}$
	2468	15	7
	5393	9	6
	11090	9	8
	4775	7	9
	4829	8	4 $\frac{1}{2}$

	£	s.	d.		£	s.	d.
(27)	2887	0	10 $\frac{3}{4}$		31424	14	11
	364	19	11 $\frac{3}{4}$		13568	15	11 $\frac{1}{2}$
	678	9	2 $\frac{3}{4}$		18797	4	8 $\frac{1}{2}$
	525	18	8		6956	2	7
	23203	1	4 $\frac{1}{2}$		7475	19	5
	6918	16	10		8880	14	6
	789	7	9 $\frac{3}{4}$		987	17	3
	7969	12	7		19369	9	8
	1789	13	6		25814	7	9
	18635	4	5		36925	6	4
	33296	8	9 $\frac{3}{4}$		3692	4	6

(28)	264	16	9	(29)	1234	5	6 $\frac{1}{2}$
	77	10	11 $\frac{1}{2}$		11898	17	9 $\frac{1}{2}$
	5698	9	8 $\frac{3}{4}$		7500	3	11 $\frac{3}{4}$
	89	8	6		6729	3	1 $\frac{3}{4}$
	576	17	10		4876	19	6 $\frac{1}{2}$
	9868	6	8 $\frac{3}{4}$		5766	4	10 $\frac{1}{2}$
	19943	11	7		63063	18	10
	857	18	6		675	6	8 $\frac{3}{4}$
	35589	9	10 $\frac{1}{2}$		19998	7	9
	6574	14	9 $\frac{3}{4}$		18765	13	5
	7965	5	9		17890	12	7 $\frac{1}{4}$
	8796	3	2 $\frac{1}{2}$		42589	14	8
	33547	19	8		3654	8	1
	6958	15	11		98	9	9
	34567	13	7		937	6	6
	960	6	8		6356	17	5
	3000	0	0		32875	15	10
	586	6	8		4484	16	10
	996	7	5		9659	3	8
	9876	17	6		2969	13	7 $\frac{1}{2}$
	12345	9	3		15778	9	5 $\frac{1}{2}$
	760	8	9 $\frac{1}{4}$		8065	0	4
	890	4	4		8383	10	4

	£	s.	d.
(30)	23579	13	7 $\frac{1}{4}$
	14968	12	8 $\frac{1}{2}$
	3498	19	2 $\frac{1}{2}$
	6457	6	8
	7989	13	4
	6876	15	9
	15053	9	8 $\frac{1}{2}$
	763	7	8 $\frac{1}{2}$
	9685	16	5
	6777	17	3 $\frac{1}{2}$
	9876	7	6

	£	s.	d.
	2564	18	2 $\frac{3}{4}$
	7288	15	0 $\frac{3}{4}$
	50000	0	0
	30997	18	6
	9854	6	6
	6789	10	11
	675	4	9
	567	5	7 $\frac{1}{2}$
	958	8	8 $\frac{1}{4}$
	8343	11	6
	18586	12	6

(31)	15868	3	10 $\frac{1}{2}$
	2505	13	8 $\frac{3}{4}$
	37747	6	3 $\frac{3}{4}$
	412	17	11
	5488	6	6 $\frac{1}{2}$
	365	8	9 $\frac{1}{2}$
	8976	0	5
	19653	9	10 $\frac{3}{4}$
	19589	18	7
	9674	14	2 $\frac{1}{2}$
	9876	15	8
	2345	7	9
	13597	7	6
	6565	7	5
	7854	16	7 $\frac{1}{4}$
	23456	9	9
	9988	5	11
	29773	8	10
	789	18	11
	7890	0	0
	9645	7	3 $\frac{1}{2}$
	3878	1	8
	15759	4	5

(32)	40917	10	11 $\frac{1}{2}$
	43996	17	7 $\frac{1}{2}$
	5288	17	7 $\frac{3}{4}$
	4875	9	8 $\frac{1}{2}$
	6300	15	10
	754	4	9 $\frac{1}{2}$
	20966	16	2
	9586	18	6
	9486	8	6 $\frac{1}{2}$
	18745	13	6 $\frac{1}{4}$
	18859	9	5
	3694	9	9
	4784	0	11 $\frac{1}{2}$
	5964	2	8
	870	19	8
	970	14	7
	39698	12	4
	543	1	2
	755	5	10 $\frac{1}{4}$
	6486	18	5
	15277	4	9
	28998	7	9
	39784	8	8



CALCULATION OF PER-CENTAGES.

SCHEME OF QUESTIONS IN PER-CENTAGES.

- I. (a) $\frac{15}{100}$ of 360 = what quantity?
 (b) $1\frac{15}{100}$ of 360 = what quantity?
 or, $\frac{115}{100}$ of 360 = what quantity?
 (c) $(1 - \frac{15}{100})$ of 360 = what quantity?
 or, $\frac{85}{100}$ of 360 = what quantity?

II. How many 100ths of 360 = 54?

[or, how many *hundredths* = $\frac{54}{100}$?]

- III. (a) $\frac{15}{100}$ of what quantity = $\frac{54}{360}$?
 (b) $1\frac{15}{100}$ of what quantity = 414?
 or, $\frac{115}{100}$ of what quantity = 414?
 (c) $(1 - \frac{15}{100})$ of what quantity = 306?
 or, $\frac{85}{100}$ of what quantity = 306?

CALCULATION OF PER-CENTAGES.

I.—*To calculate a given per centage on any given quantity.*

RULE.—Write the rate per cent. in form of a fraction, having the number of the rate as numerator and 100 as denominator, and calculate that fraction of the given quantity.

(i)—1 per cent. on any quantity means—

1 for every 100 in it, or $\frac{1}{100}$ of it;

2 per cent. on any quantity means $\frac{2}{100}$ of it;

$2\frac{1}{2}$ per cent. on any quantity means $\frac{2\frac{1}{2}}{100}$ of it;

&c.

&c.

The numbers 1, 2, $2\frac{1}{2}$, &c., thus used are called *rates* per cent.

Hence, to find R per cent. of any quantity, take $\frac{R}{100}$ of the quantity; that is, divide the quantity by 100 and then multiply by R ; or, which is generally more convenient, first multiply the quantity by R and then divide by 100.

Examples.

Ex. 1. I had 360*l.*, but lost 15 per cent. of it; what sum did I lose?
[SCHEME.—I. *a.*]

15 per cent. on 360*l.* is $\frac{15}{100}$ of 360*l.*;
= $3 \cdot 6*l.* \times 15$, or = $5400*l.* \div 100$, = 54*l.* *Ans.*

Ex. 2. Suppose a mass of lead ore, weighing 165 lbs., to contain 76 per cent. of lead. Required the weight of lead.

The weight of lead is $\frac{76}{100}$ of 165 lbs. = $165 \times 76 \div 100$;
= $12540 \div 100$ = 125·4, or $125\frac{2}{5}$ lbs. *Ans.*

Ex. 3. I cleared $6\frac{1}{2}$ per cent. on an investment of 2500*l.* What was the amount of gain?

$$\begin{aligned} \frac{6\frac{1}{2}}{100} \text{ of } 2500\textit{l.} &= 2500\textit{l.} \times 6\frac{1}{2} \div 100 = 16250\textit{l.} \div 100; \\ &= 162\textit{l. } 10\textit{s. } \textit{Ans.} \end{aligned}$$

Ex. 4. In settling a bill of 64*l.* 15*s.* 10*d.* a discount of 5 per cent. was allowed; what was the sum of discount?

The discount is $\frac{5}{100}$ of 64*l.* 15*s.* 10*d.*

$$\begin{array}{r} 5 \\ \hline 3,23\textit{l. } 19 \quad 2 \div 100 = 3\textit{l. } 4\textit{s. } 9\frac{1}{2}\textit{d. } \textit{Ans.} \\ 20 \\ \hline 4,79\textit{s.} \\ 12 \\ \hline 9,50\textit{d.} = 9\frac{1}{2}\textit{d.} \end{array}$$

Ex. 5. I bought goods for 28*l.* 12*s.* 4*d.*, and sold them at a profit of $7\frac{1}{2}$ per cent.; what was the amount of my profit?

The profit = $\frac{7\frac{1}{2}}{100}$ of 28*l.* 12*s.* 4*d.*

$$\begin{array}{r} 7\frac{1}{2} \\ \hline 14 \quad 6 \quad 2 \\ 200 \quad 6 \quad 4 \\ \hline 2,14\textit{l. } 12 \quad 6 \div 100 = 2\textit{l. } 2\textit{s. } 11\frac{1}{10}\textit{d. } \textit{Ans.} \\ 20 \\ \hline 2,92\textit{s.} \\ 12 \\ \hline 11,10\textit{d.} = 11\frac{1}{10}\textit{d.} \end{array}$$

(ii.).—The rule of multiplying by the rate and dividing by 100 is most conveniently applied in a form which we now proceed to exemplify.

Ex. 6. Calculate an allowance of 5 per cent. on 64*l.* 15*s.* 10*d.*

Here let us first represent 5 times 64*l.* 15*s.* 10*d.* in the symbolic form, 64*l.* 15*s.* 10*d.* $\times 5$; then let us represent symbolically the division by 100, which is signified thus, $\frac{64\textit{l. } 15\textit{s. } 10\textit{d.} \times 5}{100}$. Now, the value of this expression will not be altered if we divide both the upper line, or dividend, and the lower line, or divisor, by any one number which we may see to be exactly contained in one factor of each. In the present instance, it is readily seen that 5 measures both 5 and 100; therefore, cancelling 5, we shall have

$$\frac{64l. 15s. 10d. \times \overset{1}{5}}{\underset{20}{100}} = \frac{64l. 15s. 10d.}{20} = 3l. 4s. 9\frac{1}{2}d. \text{ Ans.}$$

Note. In dividing *l. s. d.* by 20, take the remainder *4l.* along with the given shillings, and say *4l. 15s.* divided by 20 gives *4s.* and 15 over; then, 12 times 15 is 180, and 10, &c., in the usual way.

Ex. 7. Calculate a gain of $3\frac{3}{4}$ per cent. on 295*l.* 13*s.* 6*d.*

$$\frac{295l. 13s. 6d. \times 3\frac{3}{4}}{\underset{20}{100} \times 4} \quad \begin{array}{l} \text{Here, multiply upper and under lines by 4, which} \\ \text{will change } 3\frac{3}{4} \text{ to a whole number, without alter-} \\ \text{ing the ratio of the dividend and divisor; then} \\ \text{cancel 5 from 15 and 100.} \end{array}$$

$$= 887l. 0s. 6d. + 80 = 11l. 1s. 9\frac{3}{4}d. \text{ Ans.}$$

Ex. 8. Calculate a loss of $3\frac{1}{2}$ per cent. on 535*l.*

$$\frac{535l. \times 3\frac{1}{2}}{\underset{20}{100}} = \frac{535l. \times 10}{\underset{20}{100} \times 3} = \frac{107l.}{6} = 17l. 16s. 8d. \text{ Ans.}$$

Ex. 9. If $6\frac{1}{2}$ per cent. of an audience of 1280 persons are women, what is the number of women? And if $5\frac{1}{2}$ per cent. of the remainder a children, what is the number of children?

$$\frac{1280 \times 6\frac{1}{2}}{\underset{4}{100}} = \frac{1280 \times \overset{1}{3\frac{1}{2}}}{\underset{4}{100} \times 4} = \frac{1280}{16} = 80 \text{ women. Ans.}$$

Remainder, $1280 - 80 = 1200$ persons:

$$\frac{1200 \times 5\frac{1}{2}}{100} = 12 \times 5\frac{1}{2} = 66 \text{ children. Ans.}$$

Ex. 10. Find the commission on 3247*l.* 13*s.* 9*d.* at $\frac{3}{8}$ per cent.

$$\frac{3247l. 13s. 9d. \times \frac{3}{8}}{100} = \frac{3247l. 13s. 9d. \times 3}{100 \times 8} = 12l. 3s. 6\frac{1}{2}d., \text{ or nearly } 12l. 3s. 7d. \text{ Ans.}$$

Note. Such expressions as 2*s.* 6*d.* per cent., 4*l.* 14*s.* 6*d.* per cent., 16 guineas per cent., are not strictly proper, as they limit the meaning of the phrase *per cent.* to *per 100l.* Still they sometimes occur; and when the student meets with them he should convert them to the denomination of *l.*, which will generalise the per centage. Thus 2*s.* 6*d.* per 100*l.* is $\frac{1}{4}$ per cent.; 4*l.* 14*s.* 6*d.* per 100*l.* is $4\frac{29}{40}$ per cent.; 16 guineas per 100*l.* is $16\frac{1}{5}$ per cent.

(iii.)—It is evident that a number being increased 15 per cent. will become $1\frac{15}{100}$, or $\frac{115}{100}$, of what it was; and that a number being diminished 15 per cent. will become $1 - \frac{15}{100}$, or $\frac{85}{100}$, of what it was. Hence, to find what a given quantity will amount to if increased 15 per cent., we may either add to the quantity $\frac{15}{100}$ of itself, or at once take $\frac{115}{100}$ of the quantity. Hence, also, to find what a given quantity will become if diminished 15 per cent., we may either subtract from the quantity $\frac{15}{100}$ of itself, or at once take $\frac{85}{100}$ of the quantity.

Similarly for other rates per cent.

Ex. 11. Bought goods for 360*l.*; for what must I sell them to gain 15 per cent? [SCHEME.—I. *b.*]

$$\frac{15}{100} \text{ of } 360\text{l.} = \frac{360\text{l.} \times 15}{100} = \frac{54}{414\text{l.}} \begin{array}{l} \text{the outlay,} \\ \text{the gain,} \end{array} \text{ Ans.}$$

$$\text{Or, } 1\frac{15}{100} \text{ of } 360\text{l.} = \frac{360 \times 115}{100} = 414\text{l.} \text{ Ans.}$$

Ex. 12. I had 360*l.*, but lost 15 per cent. of it; what sum had I remaining? [SCHEME.—I. *c.*]

$$\frac{15}{100} \text{ of } 360\text{l.} = \frac{360 \times 15}{100} = \frac{54}{306\text{l.}} \begin{array}{l} \text{original sum,} \\ \text{sum lost,} \end{array} \text{ Ans.}$$

$$\text{Or, } \left(1 - \frac{15}{100}\right) \text{ of } 360 = \frac{360 \times 85}{100} = 306\text{l.} \text{ Ans.}$$

(iv.)—When a rate per cent. is charged for the use of money per annum, the rate per annum multiplied by the number of years will, of course, give the corresponding rate for the whole time.

Simple Interest.

Ex. 13. What is the simple interest on 360*l.*, at 5 per cent. per annum, for 3 years? [SCHEME.—I. *a.*]

Here, the rate, being 5 per cent. for 1 year, amounts to 15 per cent. in 3 years, and the interest is simply 15 per cent. on 360*l.*

$$\therefore \frac{15}{100} \text{ of } 360\text{l.} = \frac{1080\text{l.}}{20} = 54\text{l.} \text{ Ans.}$$

Ex. 14. Find the simple interest on 1202*l.* 16*s.* 8*d.*, at $5\frac{1}{4}$ per cent. per annum, for $2\frac{1}{2}$ years.

$$\begin{aligned} \frac{5\frac{1}{4} \times 2\frac{1}{2}}{100} \text{ of } 1202\textit{l. } 16\textit{s. } 8\textit{d.} &= \frac{1202\textit{l. } 16\textit{s. } 8\textit{d.} \times 21 \times \overset{1}{8}}{\underset{20}{100 \times 8}} \\ &= \frac{150\textit{l. } 7\textit{s. } 1\textit{d.} \times 21}{20} = 150\textit{l. } 7\textit{s. } 1\textit{d.} \times 1\frac{1}{20} \\ \frac{1}{20} &= \frac{7 \quad 10 \quad 4\frac{1}{2}}{157\textit{l. } 17\textit{s. } 5\frac{1}{2}\textit{d.}} \quad \text{Ans.} \end{aligned}$$

In the above process, we removed fractions from the first numerator, by multiplying it by 4 and 2, multiplying accordingly the denominator also by 8; and we then found, after cancelling, that we should have to multiply a sum of money by 21 and divide by 20, which is the same as multiplying by $\frac{21}{20}$, or by $1\frac{1}{20}$.

Ex. 15. Calculate the simple interest on 721*l.* 13*s.* 6*d.*, at $3\frac{3}{8}$ per cent. per annum, for 2 years 11 months.

As the rate is *per annum*, we use the given time in the denomination of *years only*, taking 2 years 11 months as $2\frac{11}{12}$ years.

$$\begin{aligned} \frac{3\frac{3}{8} \times 2\frac{11}{12}}{100} \text{ of } 721\textit{l. } 13\textit{s. } 6\textit{d.} &= \frac{721\textit{l. } 13\textit{s. } 6\textit{d.} \times \overset{9}{27} \times \overset{7}{35}}{\underset{20}{100 \times 8 \times 12}} \\ &= 45465\textit{l. } 10\textit{s. } 6\textit{d.} + 640 = 71\textit{l. } 0\textit{s. } 9\frac{183}{20}\textit{d.} \quad \text{Ans.} \end{aligned}$$

Ex. 16. What is the simple interest on 346*l.*, at $4\frac{1}{2}$ per cent. per annum, for 8 months?

The given time, 8 months = $\frac{8}{12}$ year = $\frac{2}{3}$ year;

$$\frac{4\frac{1}{2} \times \frac{2}{3}}{100} \text{ of } 346\textit{l.} = \frac{346\textit{l.} \times \overset{3}{2} \times \overset{2}{2}}{100 \times 2 \times 3} = 10\textit{l. } 7\textit{s. } 7\frac{1}{2}\textit{d.} \quad \text{Ans.}$$

Ex. 17. Find the simple interest on 547*l.* 13*s.* 4*d.*, at 6 per cent. per annum, for 3 years 21 days.

$$\begin{aligned} \frac{6 \times 3\frac{21}{365}}{100} \text{ of } 547\frac{21}{3}\textit{l.} &= \frac{547\frac{21}{3}\textit{l.} \times 6 \times 3 \times 1\frac{7}{365}}{100} \\ &= \frac{1643\textit{l.} \times 6 \times 372}{36500} = \frac{3667176\textit{l.}}{36500} = 100\textit{l. } 9\textit{s. } 4\frac{1714}{1625}\textit{d.} \quad \text{Ans.} \end{aligned}$$

Ex. 18. To what sum will 360*l.* amount, by simple interest, in 3 years, at 5 per cent. per annum? [SCHEME.—I. *b.*]

Here, we may first, as in Example 13, find the interest of 360*l.* to be 54*l.*; then, 360*l.* + 54*l.* = 414*l.*, the amount. *Ans.*

Or, we may proceed thus:—

The interest = $\frac{15}{100}$ of the principal; therefore, the amount of principal and interest = $1\frac{15}{100}$ of the principal.

$$\frac{115}{100} \text{ of } 360\textit{l.} = 414\textit{l.} \quad \textit{Ans.}$$

II. (i).—To find what per centage one given quantity is of another.

RULE.—Write the former quantity as numerator of a fraction, having the latter quantity as denominator, and multiply that fraction by 100.

Ex. 1. How much per cent. of 360 cwt. is 54 cwt.? [SCHEME.—II.]

Here we are required to express as a per centage fraction the proportion of 54 in 360 or $\frac{54}{360}$; that is, we are to change $\frac{54}{360}$ into an equivalent fraction whose denominator is 100. Now, to reduce any quantity to 100ths, we multiply by 100; accordingly, $\frac{54}{360} \times 100 = 15$ hundredths, or 15 per cent. *Ans.*

Compare the verification, $\frac{54}{360} [+ \frac{15}{100}] = \frac{3}{20} [+ \frac{5}{20}] = \frac{15}{100}$.

Ex. 2. At what rate per cent. does an outlay of 273*l.* produce a gain of 17*l.* 11*s.*?

$$17\textit{l. } 11\textit{s.} \text{ is } \frac{17\frac{11}{20}}{273} \text{ of the outlay} = \frac{351}{273 \times 20} \text{ of the outlay;}$$

$$\therefore \frac{351}{273 \times 20} \times 100 = \frac{351 \times 100}{273 \times 20} = \frac{27 \times 5}{21} = 6\frac{2}{3} \text{ per cent.} \quad \textit{Ans.}$$

Ex. 3. In lieu of a debt of 26*l.* 13*s.* 4*d.* owing to me, I have accepted an offer of 10*l.*; what is my loss per cent.?

$$16\frac{2}{3}\textit{l.} \text{ is lost on } 26\frac{2}{3}\textit{l.}; \text{ and } 16\frac{2}{3}\textit{l.} \text{ is } \frac{16\frac{2}{3}}{26\frac{2}{3}} \text{ of the debt} = \frac{50}{80}$$

$$\text{or } \frac{5}{8} \text{ of the debt; } \therefore \frac{5}{8} \times 100 = 62\frac{1}{2} \text{ per cent. loss.} \quad \textit{Ans.}$$

Ex. 4. If I buy cloth at 23*s.* 10*d.* the yard, and sell it at 26*s.*, what will be my gain per cent.?

$$26\textit{s.} - 23\textit{s. } 10\textit{d.} = 2\textit{s. } 2\textit{d.} \text{ gained on } 23\textit{s. } 10\textit{d.}, \text{ or } 26\textit{d.} \text{ gained on } 286\textit{d.};$$

$$\therefore \frac{26}{286} \text{ of } 100 = \frac{1}{11} \text{ of } 100 = 9\frac{1}{11} \text{ per cent.} \quad \textit{Ans.}$$

Ex. 5. I bought calico at the rate of 21s. 7d. for 19 yards, and sold it at the rate of 16s. 11d. for 15 yards; what was my gain or loss per cent?

Prime cost per yard = $\frac{259d.}{19}$; selling price per yard = $\frac{203d.}{15}$; or, cancelling 7, we can say that what was bought for $\frac{37}{19}$ was sold for $\frac{29}{15}$; hence, reducing to a common denominator, we find that what was bought for 555 was sold for 551; so that there was a loss of 4 on 555; $\therefore \frac{4}{555}$ of 100 = $\frac{80}{111}$ per cent. loss. *Ans.*

(ii.)—The rule for the present case is applicable to find at what yearly rate per cent. a given principal would yield a given sum of interest in a given time; and also to find in what time a given principal would yield a given sum of interest at a given yearly rate per cent.

Ex. 6. At what yearly rate per cent. would 360*l.* yield 54*l.*, simple interest, in 3 years? [SCHEME.—II.]

The whole interest is $\frac{54}{360}$ of the principal;
 $\therefore$ the whole per centage for the 3 years = $\frac{54}{360}$ of 100,
 $\therefore$ dividing by 3, to get the rate per annum, we have

$$\frac{54 \times 100}{360 \times 3} = 100 \div 20 = 5 \text{ per cent. per annum. } \textit{Ans.}$$

Ex. 7. At what rate per cent. per annum, would 285*l.* produce 54*l.* 17s. 3d., simple interest, in $5\frac{1}{2}$ years?

The whole per centage = $\frac{54l. \ 17s. \ 3d.}{285l.}$ of 100;
 $\therefore$ dividing by $5\frac{1}{2}$, to get the rate per annum, we have

$$\frac{54l. \ 17s. \ 3d. \times 100 \times 4}{285l. \times 21} = \frac{209}{57} = 3\frac{2}{3}. \textit{ Ans}$$

Ex. 8. The sum of 110*l.* 6s. 3d., being improved at simple interest, for 7 months, amounted to 112*l.* 17s. $8\frac{3}{4}d.$ What was the rate per cent. per annum?

112*l.* 17s. $8\frac{3}{4}d.$ — 110*l.* 6s. 3d. = 2*l.* 11s $5\frac{1}{4}d.$ interest;
 $\therefore$ the whole per centage = $\frac{2l. \ 11s. \ 5\frac{1}{4}d.}{110l. \ 6s. \ 3d.}$ of 100;
 $\therefore$ dividing by $\frac{7}{12}$ of a year, to get the rate per annum,

$$\frac{2l. \ 11s. \ 5\frac{1}{4}d. \times 100 \times 12}{110l. \ 6s. \ 3d. \times 7} = \frac{9884}{2471} = 4. \textit{ Ans.}$$

Ex. 9. At what rate per cent. per annum would 152*l.* 1*s.* 8*d.* yield 2*l.* 6*s.* 3 $\frac{3}{4}$ *d.*, simple interest, in 247 days?

$$\text{The whole per centage} = \frac{2\text{ }l. \text{ } 6\text{ }s. \text{ } 3\frac{3}{4}\text{ }d.}{152\text{ }l. \text{ } 1\text{ }s. \text{ } 8\text{ }d.} \text{ of } 100;$$

$\therefore$ dividing by $\frac{365}{247}$ of a year, to get the rate per annum,

$$\frac{2\text{ }l. \text{ } 6\text{ }s. \text{ } 3\frac{3}{4}\text{ }d. \times 100 \times 365}{152\text{ }l. \text{ } 1\text{ }s. \text{ } 8\text{ }d. \times 247} = \frac{2223}{988} = 2\frac{1}{4}. \text{ Ans.}$$

Ex. 10. In what time would the simple interest of 360*l.*, at 5 per cent. per annum, be 54*l.*? [SCHEME.—II.]

$$\text{The whole per centage} = \frac{54\text{ }l.}{360\text{ }l.} \text{ of } 100;$$

$\therefore$ dividing by the annual rate, 5, to get the number of years,

$$\frac{54 \times 100}{360 \times 5} = 54 \div 18 = 3 \text{ years. Ans.}$$

Ex. 11. In what time would 284*l.* produce 10*l.* 13*s.* simple interest, at 4 $\frac{1}{2}$ per cent. per annum?

$$\text{The whole per centage} = \frac{10\text{ }l. \text{ } 13\text{ }s.}{284\text{ }l.} \text{ of } 100;$$

$\therefore$ dividing by the yearly rate, 4 $\frac{1}{2}$, to get the time in years,

$$\frac{213 \times 100 \times 2}{284 \times 20 \times 9} = \frac{30}{38} = \frac{10}{12} \text{ year} = 10 \text{ months. Ans.}$$

Ex. 12. In what time will the simple interest on 82*l.* 2*s.* 6*d.* be 17*s.* 3 $\frac{9}{10}$ *d.*, if the rate per annum be 2 $\frac{1}{2}$ per cent?

$$\text{The whole per centage} = \frac{17\text{ }s. \text{ } 3\frac{9}{10}\text{ }d.}{82\text{ }l. \text{ } 2\text{ }s. \text{ } 6\text{ }d.} \text{ of } 100;$$

$\therefore$ dividing by 2 $\frac{1}{2}$, to get the number of years,

$$\frac{8\text{ }l. \text{ } 13\text{ }s. \text{ } 3\text{ }d. \times 10 \times 2}{82\text{ }l. \text{ } 2\text{ }s. \text{ } 6\text{ }d. \times 5} = \frac{154}{385} \text{ year} = 154 \text{ days. Ans.}$$

III. (i).—*To find the quantity of which a given quantity is a given per-centage.*

RULE.—Divide the given quantity by the per-centage fraction.

Ex. 1. Of what sum of money would 15 per cent. be 54*l.*?

[SCHEME.—III. a.]

$\frac{15}{100}$ of the sum required is to be 54*l.*;

$\therefore$ the required sum = $54\text{ }l. \div \frac{15}{100} = 54\text{ }l. \times \frac{100}{15} = 360\text{ }l. \text{ Ans.}$

Ex. 7. What sum, put out at simple interest, for 3 years 9 months, at $4\frac{1}{2}$ per cent. per annum, will produce 20*l.* 7*s.* $1\frac{5}{16}$ *d.*?

Rate for the whole time $4\frac{1}{2} \times 3\frac{3}{4} = \frac{9}{2} \times \frac{15}{4} = 16\frac{7}{8}$ per cent.

$\therefore \frac{16\frac{7}{8}}{100}$ of the required principal is 20*l.* 7*s.* $1\frac{5}{16}$ *d.*

$$\therefore \text{the required principal} = 20\text{l. } 7\text{s. } 1\frac{5}{16}\text{d.} \times \frac{100}{16\frac{7}{8}} \\ = \frac{325\text{l. } 13\text{s. } 9\text{d.} \times 100 \times 8}{16 \times 135} = \frac{325\text{l. } 13\text{s. } 9\text{d.} \times 10}{27} = 120\text{l. } 12\text{s. } 6\text{d.} \quad \text{Ans.}$$

Ex. 8. The simple interest of a sum of money, that was lent 219 days ago, at the rate of $3\frac{1}{2}$ per cent. per annum, now amounts to 17*l.* 13*s.* $10\frac{1}{2}$ *d.* What was the sum lent?

Rate for the given time $= 3\frac{1}{2} \times \frac{219}{365} = \frac{7}{2} \times \frac{9}{5} = 2\frac{1}{10}$ per cent.;

$\therefore \frac{2\frac{1}{10}}{100}$, or $\frac{21}{1000}$, of the required sum is 17*l.* 13*s.* $10\frac{1}{2}$ *d.*;

$$\therefore \text{the required sum is} = 17\text{l. } 13\text{s. } 10\frac{1}{2}\text{d.} \times \frac{1000}{21} \\ = \frac{88\text{l. } 9\text{s. } 3\text{d.} \times 200}{21} = \frac{12\text{l. } 12\text{s. } 9\text{d.} \times 200}{3} = 842\text{l. } 10\text{s.} \quad \text{Ans.}$$

(ii.)—The Rule for the present case is applicable to find a quantity which, if increased, or diminished, by a given percentage, would become a given quantity.

Ex. 9. What quantity increased by 15 per cent. would become 414? [SCHEME.—III. *b.*]

The required quantity, increased by $\frac{15}{100}$ of itself would become $1\frac{15}{100}$ of what it was, that is, 115 per cent. of what it was;

$\therefore \frac{115}{100}$ of the required quantity = 414;

$\therefore$ the required quantity = $414 \times \frac{100}{115} = 360$. *Ans.*

Ex. 10. What quantity diminished by 15 per cent. would become 306? [SCHEME.—III. *c.*]

The required quantity, diminished by $\frac{15}{100}$ of itself, would become $(1 - \frac{15}{100})$ of what it was, that is, 85 per cent. of what it was;

$\therefore \frac{85}{100}$ of the required quantity = 306;

$\therefore$ the required quantity = $306 \times \frac{100}{85} = 360$ *Ans.*

Ex. 11. I gained $22\frac{1}{2}$ per cent. by selling a pipe of port for 36*l.* 15*s.*; what did it cost me?

The original price, increased by $\frac{22\frac{1}{2}}{100}$ of itself, became
 $1\frac{22\frac{1}{2}}{100}$ of what it was; that is, $122\frac{1}{2}$ per cent. of what it was;

$$\therefore \frac{122\frac{1}{2}}{100} \text{ of the prime cost} = 36l. 15s.;$$

$$\therefore \text{the prime cost} = 36l. 15s. \times \frac{100}{122\frac{1}{2}} = 30l. \quad \text{Ans.}$$

Ex. 12. If by selling 29 dozen of brandy at 4 guineas a dozen, I would gain 16 per cent., what would be my gain or loss per cent. if I sold it at 3*l.* 13*s.* 6*d.* a dozen? and what did the 29 dozen cost me?

Here, 84*s.* = 116 per cent. of the prime cost;

$$\therefore 1s. = \frac{1}{84} \text{ of } 116 \text{ per cent. of ditto};$$

$$\therefore 73\frac{1}{2}s. = \frac{73\frac{1}{2}}{84} \text{ of } 116 \text{ per cent. of ditto};$$

$$= \frac{7}{8} \text{ of } 116 = 101\frac{1}{2} \text{ per cent. of the prime cost};$$

which shows a gain of $1\frac{1}{2}$ per cent. *Ans.*

Also, the prime cost of a dozen being $84s. \times \frac{100}{116}$, that of 29 dozen would be $\frac{84s. \times 100 \times 29}{116} = 105l. \quad \text{Ans.}$

Ex. 13. By selling 3 cwt. of coffee at 1*s.* 7*d.* per lb. I should lose $\frac{1}{4}$ per cent.; what did the whole quantity cost me? and at what selling price per lb. would my gain be 5 per cent.?

$$\frac{99\frac{3}{4}}{100} \text{ of the whole prime cost} = 19d. \times 336;$$

$$\therefore \text{the whole prime cost} = 19d. \times 336 \times \frac{100}{99\frac{3}{4}} = 26\frac{3}{4}l. \quad \text{Ans.}$$

Again; since $99\frac{3}{4}$ per cent. of the prime cost per lb. = 19*d.*

$$\therefore 1 \text{ per cent. of ditto} = \frac{19}{99\frac{3}{4}}d. = \frac{4}{21}d.$$

$$\therefore 105 \text{ per cent. of ditto} = \frac{4 \times 105}{21}d. = 20d. \quad \text{Ans.}$$

(iii.)—The Rule for the present case is applicable to find the present value of a given sum of money due at a given future time; for that is to find what principal improved by simple interest at a given rate will amount to a given sum.

Ex. 14. What principal, at 5 per cent. per annum, simple interest, would in 3 years amount to 414*l.*? [Scheme.—III. b.]

The whole interest on 100 is $5 \times 3 = 15$;

the principal, increased by $\frac{15}{100}$ of itself, becomes $1\frac{15}{100}$ of what it was, that is, $\frac{115}{100}$ of what it was;

$\therefore \frac{115}{100}$ of the required principal = 414*l.*;

$\therefore$ the principal = $414\text{ l.} \times \frac{100}{115} = 360\text{ l.}$ *Ans.*

Ex. 15. What discount should be allowed for present payment of a debt of 414*l.*, due 3 years hence, if the use of money be worth 5 per cent. per annum, simple interest?

The present worth of the debt being found to be 360*l.*, as in the preceding example, we have $414\text{ l.} - 360\text{ l.} = 54\text{ l.}$, the discount. *Ans.*

Otherwise. The discount on 115 being 15, or the rate of discount being $\frac{15}{115}$ of the debt, we have $\frac{15}{115}$ of 414*l.* = 54*l.* *Ans.*

Ex. 16. What principal, improved by simple interest, at $2\frac{3}{4}$ per cent. per annum, would in $4\frac{2}{3}$ years, amount to 26*l.* 15*s.* $11\frac{1}{2}$ *d.*?

The whole interest on 100 is $2\frac{3}{4} \times 4\frac{2}{3} = 12\frac{5}{6}$;

the principal, increased by $\frac{12\frac{5}{6}}{100}$ of itself, becomes $1\frac{12\frac{5}{6}}{100}$ of what it was, that is, $\frac{112\frac{5}{6}}{100}$ of what it was;

$\therefore \frac{112\frac{5}{6}}{100}$ of the required principal = 26*l.* 15*s.* $11\frac{1}{2}$ *d.*;

$\therefore$ the principal = $26\text{ l. } 15\text{ s. } 11\frac{1}{2}\text{ d.} \times \frac{100}{112\frac{5}{6}}$;

$= \frac{160\text{ l. } 15\text{ s. } 9\text{ d.} \times 100}{677} = 23\text{ l. } 15\text{ s.}$ *Ans.*

Ex. 17. What sum paid at present would discharge a debt of 79*l.* 6*s.*, payable 4 months hence, if the use of money be reckoned worth 5 per cent. per annum, simple interest?

The whole interest on 100 is $5 \times \frac{1}{3} = 1\frac{2}{3}$.

the present worth required would, by being increased by $\frac{1\frac{2}{3}}{100}$ of itself, become $1\frac{1\frac{2}{3}}{100}$ of itself;

$\therefore \frac{101\frac{2}{3}}{100}$ of the present worth = 79*l.* 6*s.*;

$\therefore$ the present worth = $79\text{ l. } 6\text{ s.} \times \frac{100}{101\frac{2}{3}}$;

$= \frac{793\text{ l.} \times 10 \times 3}{305} = 13\text{ l.} \times 2 \times 3 = 78\text{ l.}$ *Ans.*

Ex. 18. What principal, improved by simple interest, for 292 days, at $3\frac{3}{4}$ per cent. per annum, would amount to 88*l.* 3*s.* 10 $\frac{1}{2}$ *d.*?

The whole interest on 100 is $3\frac{3}{4} \times \frac{292}{365} = 3$;

the principal, increased by $\frac{3}{100}$ of itself, becomes $1\frac{3}{100}$, or $\frac{103}{100}$ of what it was;

$\therefore \frac{103}{100}$ of the required principal = 88*l.* 3*s.* 10 $\frac{1}{2}$ *d.*;

$\therefore$ the principal = 88*l.* 3*s.* 10 $\frac{1}{2}$ *d.* $\times \frac{100}{103}$

= 88*l.* 7*s.* 6*d.* $\div 103$ = 85*l.* 12*s.* 6*d.* *Ans.*

Ex. 19. If I buy cotton goods at 1*s.* 7*d.* a yard, on 7 months' credit, and sell them immediately at 1*s.* 8*d.* cash, what is my present gain per cent.? The use of money to be reckoned worth 5 per cent. per annum.

Here, we must find the cash value, or present worth, of the credit price. The interest on 100 is $5 \times \frac{7}{12} = 2\frac{11}{12}$;

$\therefore 19*d.* = \frac{102\frac{11}{12}}{100}$ of its present worth;

$\therefore$ its present worth = 19*d.* $\times \frac{100}{102\frac{11}{12}} = 18\frac{8}{13}$ *d.*

Hence, we have now the cash buying price, $18\frac{8}{13}$ *d.*, and the cash selling price, 20*d.*, to find the gain per cent.—And this, as in *Ex. 4*, Case II., will be found to be $8\frac{1}{3}$ per cent. *Ans.*

EXAMINATION PAPERS IN PER-CENTAGES.

PAPER I.

(1) What sum is 3 per cent. on 525*l.*? and what sum is 4 per cent. on 27*l.* 12*s.* 1*d.*?

(2) Calculate a profit of $5\frac{3}{7}$ per cent. on an outlay of 259*l.*

(3) A loss of 5 per cent. on a certain outlay amounted to 1*l.* 8*s.* 7*d.*; what was the amount of outlay?

(4) I bought goods for 325*l.* and sold them for 351*l.*; what was my gain per cent?

(5) If 10 yards of cloth cost me 22*s.* 6*d.* a yard, for what must I sell the whole to gain $8\frac{1}{4}$ per cent?

(6) If I lose $53\frac{1}{4}$ per cent. on a debt of 26*l.* 13*s.* 4*d.* owing to me, what sum shall I receive?

(7) If 66 children constitute $6\frac{1}{4}$ per cent. of a mixed audience, what is the whole number of persons?

(8) If iron is bought at 12*l.* a ton, and sold at $1\frac{1}{2}$ *d.* a lb., what is gained per cent?

(9) By selling goods for 290*l.* 10*s.* I gained $10\frac{2}{3}$ per cent.; what did the goods cost me?

(10) Find the simple interest on 94*l.* 4*s.* 2*d.*, at $3\frac{1}{2}$ per cent. per annum, for 3 years.

(11) Suppose the alloy in silver coin to be $6\frac{1}{4}$ per cent. of the mass, what would a crown piece be worth if it were all silver?

(12) If 9 per cent. would be lost by selling a horse for 78*l.* 15*s.*, what would be gained or lost per cent. if he were sold for 90*l.*?

PAPER II.

(1) A quantity of goods weighed 625 cwt., of which $5\frac{1}{2}$ per cent. was damaged; what did the remainder weigh?

(2) Bought goods for 10*l.* 2*s.* 6*d.*, and sold them for 10*l.* 11*s.* 6*d.*; what did I gain per cent.?

(3) Calculate $3\frac{1}{8}$ per cent. commission on 324*l.* 17*s.* 4*d.*

(4) How many guineas does a profit of $12\frac{1}{4}$ per cent. on 960*l.* amount to?

(5) If cloth cost me 23*s.* 10*d.* a yard, at what price must I sell it to gain $9\frac{1}{11}$ per cent?

(6) Lost $\frac{1}{4}$ per cent. in selling 3 cwt. of coffee, which cost me 26*l.* 13*s.* 4*d.*; at what price per lb. did I sell it?

(7) I bought 29 dozen of brandy for 105*l.*; at what must I sell it per dozen to make a profit of $1\frac{1}{2}$ per cent?

(8) If I should gain $3\frac{7}{8}$ per cent. by selling a butt of sherry for 55*l.* 8*s.*, what did it cost me?

(9) Calculate the simple interest on 9*l.* 10*s.* 1*½d.*, at 4 per cent. per annum for 7 years.

(10) If I should lose 2 per cent. by selling a butt of sherry for 51*l.* 9*s.*, for what must I sell it to gain $2\frac{1}{2}$ per cent?

(11) At what rate per cent. per annum will the simple interest on 1147*l.* 3*s.* 9*d.* amount to 200*l.* 15*s.* 1*¾d.* in $3\frac{1}{2}$ years?

(12) A man purchases a bale of cloth containing 80 yards, at 32*s.* per yard. He sells half of it at an advance of 25 per cent., two-fifths of it at an advance of 4*s.* per yard, and the remainder, which is damaged, at a loss of 15 per cent. Find his total gain, and his gain per cent.

PAPER III.

(1) In a population of 13675 the proportion of females is 48 per cent.; what is the number of males?

(2) On an outlay of 535*l.* I lost 17*l.* 16*s.* 8*d.*; what was my loss per cent.?

(3) I bought goods for 28*l.* 12*s.* 4*d.*, and sold them for 30*l.* 15*s.* $3\frac{1}{10}$ *d.*; required my gain per cent.

(4) What is the simple interest on 2793*l.* 16*s.* 10*d.* at 3 per cent. per annum for 9 months?

(5) On what sum would a loss of $3\frac{3}{4}$ per cent. amount to 11*l.* 1*s.* $9\frac{3}{40}$ *d.*?

(6) I sold goods for 183*l.* 8*s.*, thereby losing $6\frac{3}{7}$ per cent; what did they cost me?

(7) In buying pine apples I give 26*s.* for 23 of them, and in selling I give 21 of them for 39*s.*; what is my profit per cent?

(8) In what time would 845*l.* amount to 921*l.* 1*s.*, by simple interest, at 4 per cent. per annum?

(9) What is the present worth of 1191*l.* 7*s.* $3\frac{1}{4}$ *d.*, due 6 years hence, at $3\frac{1}{8}$ per cent. per annum, simple interest?

(10) A speculator sells at a profit of 62 per cent.; but his purchaser fails, and pays only 12*s.* 6*d.* in the pound. How much per cent. does the speculator gain or lose by his venture?

(11) After losing 15 per cent. on a sum of money, and then 14 per

cent. on the remainder, I had 219*l.* 6*s.* left; what was the original sum?

(12) A corn merchant buys 41 quarters for 102*l.* 18*s.* 4*d.*, and sells 26 at 56*s.* 6*d.* per quarter. At what price per quarter must he sell the remainder, that his gain on the whole may be 14 per cent.?

PAPER IV.

(1) The discount on a certain sum, at $4\frac{1}{2}$ per cent. is 5*s.* 9 $\frac{3}{4}$ *d.*; what is the sum?

(2) What quantity being increased by $111\frac{1}{2}$ per cent. will amount to 564?

(3) How much per cent. of weight is lost in malting, when 240 lbs. of barley produces 195 lbs. of malt?

(4) I bought 3 cwt. of coffee for 26*l.* 13*s.* 4*d.*, and sold it at 1*s.* 7*d.* a lb.; what did I gain or lose per cent.?

(5) I sold 29 dozen of brandy at 4 guineas a dozen, and thereby made a total profit of 5*l.* 16*s.*; what was my gain per cent.?

(6) What sum put out at simple interest, for 3 years 73 days, at $3\frac{3}{4}$ per cent. per annum, would yield 2*l.* 16*s.* 9 $\frac{1}{4}$ *d.*?

(7) Find the present value of 266*l.* 12*s.*, payable 63 days hence, at $2\frac{1}{2}$ per cent. per annum?

(8) If 12*l.* be the present value of 12*l.* 6*s.*, due 6 months hence, what is the annual rate of interest?

(9) How much better per cent. is it to sell goods at 4 per cent. profit, than to sell them at $2\frac{1}{3}$ per cent. loss?

(10) A person buys 24 gallons of spirits at 17*s.* 6*d.* a gallon, and 60 gallons at 16*s.* 4*d.*, and mixes the two quantities. At what price per gallon should he sell the mixture that his gain may be 7 per cent.?

(11) A tradesman who is ready to allow 5 per cent. per annum, simple interest, for cash, is asked to give credit for 18 months. If he charge 27*l.* 11*s.* 10*d.* in his bill, what ought the cash price to have been?

(12) A buyer of goods pays for insurance $\frac{1}{12}$ per cent. on the invoice price, and is allowed a discount of 9 per cent. off that price for prompt payment. On the whole, the goods cost him 1461*l.* 17*s.* 9*d.*; calculate the invoice price.

PAPER V.

(1) On what sum will a commission of $\frac{3}{8}$ per cent. amount to 12*l.* 3*s.* 7*d.*?

(2) Find the simple interest on 1265*l.*, at $3\frac{2}{3}$ per cent. per annum, for 146 days.

- (3) I bought 114 yards of silk for 49*l.* 17*s.* 6*d.*, but have lost $6\frac{2}{3}$ per cent. in selling it. At what price per yard have I sold it?
- (4) In what time would the simple interest on 68*l.* 7*s.* 6*d.*, at $6\frac{1}{2}$ per cent. per annum, amount to 31*l.* 4*s.*?
- (5) In what time would any sum of money double itself, by simple interest, at $3\frac{3}{4}$ per cent. per annum?
- (6) If barley by being converted into malt is increased in bulk $3\frac{1}{2}$ per cent., how much barley would make 86 quarters of malt?
- (7) If by selling oranges at the rate of 33 for 2*s.* 8*d.* I should gain 20 per cent., what should I lose or gain per cent. by selling them at the rate of 27 for 1*s.* 8*d.*?
- (8) If I should lose 4 per cent. by selling goods for 85*s.* 4*d.*, what should I lose or gain per cent. by selling them for 89*s.*?
- (9) I bought a watch for 13*l.* 13*s.* 4*d.* on 6 months' credit, and sold it immediately for 15*l.* 5*s.*, on 4 months' credit. If credit be worth 5 per cent. per annum, what was my immediate gain per cent.?
- (10) A can excavate $3\frac{1}{2}$ cubic yards in $3\frac{1}{2}$ hours; B, $3\frac{1}{2}$ cubic yards in $3\frac{1}{2}$ hours. By how much per cent. is B's expertness superior to A's? and by how much is A's inferior to B's?
- (11) Calculate the present worth of 154*l.* 7*s.* 11*d.*, due 247 days hence, at $2\frac{1}{2}$ per cent. per annum, simple interest.
- (12) A wine merchant buys 120 gallons of spirits, at 16*s.* 8*d.* a gallon, and he sells 80 gallons of it at 21*s.* 6*d.*; at what price per gallon must he sell the remainder that his gain on the whole may be 25 per cent.?

PAPER VI.

- (1) If cloth be bought at 18*s.* 9*d.* per ell, at what should it be sold per yard to gain $16\frac{2}{3}$ per cent.?
- (2) Calculate the amount, at simple interest, of 265*l.*, at $4\frac{1}{2}$ per cent. per annum, for 213 days.
- (3) If goods, bought for a certain number of crowns, are sold for one-fourth the same number of guineas, what is gained per cent.?
- (4) At what rate per cent. per annum would the simple interest on 1202*l.* 16*s.* 8*d.* be 157*l.* 17*s.* 5*d.* at the end of $2\frac{1}{2}$ years?
- (5) By selling a horse for 87*l.* I lost $\frac{4}{7}$ per cent.; what was the prime cost?
- (6) How much worse per cent. is it to sell goods at $3\frac{1}{2}$ per cent. loss, than to sell them at $7\frac{1}{2}$ per cent. profit?
- (7) What principal will amount to 339*l.* 17*s.* 3*d.* in $5\frac{1}{2}$ years, at $3\frac{2}{3}$ per cent. per annum, simple interest?

(8) If by selling oranges at the rate of 25 for 2s. 4d. I would gain 14 per cent., how many should I sell for 1s. 9d. in order to gain 12½ per cent.?

(9) What discount should be allowed for present payment of a debt of 524*l.*, payable 11 months hence, if the use of money be reckoned worth 10 per cent. per annum?

(10) If I buy goods for a certain sum on 224 days' credit, and forthwith sell them for the same sum on 148 days' credit, what is my immediate gain per cent.? Credit to be valued at 5 per cent. per annum.

(11) A and B have each a sum of money; and the simple interest of A's at 2½ per cent. per annum, for 4 years 7 months, would be equal to that of B's at 2½ per cent. per annum, for 2 years 4 months. Compare the sums possessed by A and B.

(12) If the price of barley be 6*s.* 1*d.* per bushel, and the cost of malting a quarter of barley be 2*s.* 2*d.*; how much malt is made from 621 quarters of barley, supposing the maltster to pay 24*s.* 2*d.* tax per quarter of malt, and gain 5 per cent. on the whole of his outlay, by selling malt at 77*s.* 1½*d.* per quarter?

ANSWERS.

ADDITION OF MONEY.

	£	s.	d.		£	s.	d.
(1)	95908	5	6	(17)	211163	17	2 $\frac{1}{2}$
(2)	132788	1	9 $\frac{1}{2}$	(18)	176977	6	5
(3)	186215	5	3 $\frac{1}{4}$	(19)	213008	10	1
(4)	154221	11	3 $\frac{1}{2}$	(20)	272310	4	10
(5)	238465	5	8 $\frac{1}{4}$	(21)	199937	3	9 $\frac{3}{4}$
(6)	180827	6	8 $\frac{1}{4}$	(22)	201919	14	6 $\frac{3}{4}$
(7)	171291	18	3 $\frac{3}{4}$	(23)	189665	14	6 $\frac{1}{4}$
(8)	174474	10	11 $\frac{1}{2}$	(24)	295187	0	0 $\frac{1}{2}$
(9)	172475	12	9 $\frac{3}{4}$	(25)	269995	8	11 $\frac{1}{2}$
(10)	143264	2	7 $\frac{3}{4}$	(26)	282176	6	0 $\frac{1}{4}$
(11)	362541	17	5	(27)	270951	11	8 $\frac{1}{4}$
(12)	218177	3	7 $\frac{3}{4}$	(28)	200793	4	0
(13)	127171	0	11	(29)	294253	0	8 $\frac{1}{2}$
(14)	163093	16	4	(30)	242154	12	2
(15)	207927	15	11 $\frac{1}{2}$	(31)	261702	12	0
(16)	173062	18	1 $\frac{1}{4}$	(32)	327607	9	3 $\frac{1}{4}$

CALCULATION OF PER-CENTAGES.

PAPER I.

- | | | |
|--|--|---|
| (1) 15 <i>l.</i> 15 <i>s.</i> ; 22 <i>s.</i> 1 <i>d.</i> | (5) 12 <i>l.</i> 3 <i>s.</i> 6 $\frac{3}{4}$ <i>d.</i> | (9) 262 <i>l.</i> 10 <i>s.</i> |
| (2) 14 <i>l.</i> 1 <i>s.</i> 2 $\frac{2}{5}$ <i>d.</i> | (6) 12 <i>l.</i> 9 <i>s.</i> 4 <i>d.</i> | (10) 9 <i>l.</i> 17 <i>s.</i> 10 $\frac{1}{20}$ <i>d.</i> |
| (3) 28 <i>l.</i> 11 <i>s.</i> 8 <i>d.</i> | (7) 1056. | (11) 5 <i>s.</i> 4 <i>d.</i> |
| (4) 8 per cent. | (8) 16 $\frac{2}{3}$. | (12) 4 per cent. gained. |

PAPER II.

- | | | |
|--|--|---|
| (1) 590 cwt. 70 lbs. | (5) 26 <i>s.</i> | (9) 2 <i>l.</i> 13 <i>s.</i> 2 $\frac{1}{4}$ <i>d.</i> |
| (2) 4 $\frac{4}{5}$. | (6) 1 <i>s.</i> 7 <i>d.</i> | (10) 53 <i>l.</i> 16 <i>s.</i> 3 <i>d.</i> |
| (3) 10 <i>l.</i> 3 <i>s.</i> 0 $\frac{1}{2}$ <i>d.</i> | (7) 3 <i>l.</i> 13 <i>s.</i> 6 <i>d.</i> | (11) 5 per cent. |
| (4) 112 guineas. | (8) 53 <i>l.</i> 6 <i>s.</i> 8 <i>d.</i> | (12) 20 <i>l.</i> 9 <i>s.</i> 7 $\frac{1}{2}$ <i>d.</i> ; 18 p.c. |

PAPER III.

- | | | |
|--|--|---|
| (1) 7111. | (5) 295 <i>l.</i> 13 <i>s.</i> 6 <i>d.</i> | (9) 1001 <i>l.</i> 2 <i>s.</i> 11 <i>d.</i> |
| (2) $3\frac{1}{3}$. | (6) 196 <i>l.</i> | (10) $1\frac{1}{4}$ per cent. gain. |
| (3) $7\frac{1}{2}$. | (7) 64 <i>qrs.</i> | (11) 300 <i>l.</i> |
| (4) 62 <i>l.</i> 17 <i>s.</i> $2\frac{149}{200}$ <i>d.</i> | (8) $2\frac{1}{4}$ years. | (12) 58 <i>s.</i> 6 <i>d.</i> |

PAPER IV.

- | | | |
|---|---|--|
| (1) 6 <i>l.</i> 9 <i>s.</i> 2 <i>d.</i> | (5) 5 per cent. | (9) $6\frac{2}{3}$. |
| (2) 266 <i>qrs.</i> | (6) 23 <i>l.</i> 13 <i>s.</i> $1\frac{1}{12}$ <i>d.</i> | (10) 17 <i>s.</i> 10 <i>d.</i> |
| (3) 18 <i>qrs.</i> | (7) 265 <i>l.</i> 9 <i>s.</i> $1\frac{1}{11}$ <i>d.</i> | (11) 25 <i>l.</i> 13 <i>s.</i> 4 <i>d.</i> |
| (4) Lost $\frac{1}{4}$ per cent. | (8) 5 per cent. | (12) 1605 <i>l.</i> |

PAPER V.

- | | | |
|--|-----------------------------------|--|
| (1) 3247 <i>l.</i> 15 <i>s.</i> $6\frac{2}{3}$ <i>d.</i> | (5) 26 years 8 months. | (9) $12\frac{1}{2}$. |
| (2) 18 <i>l.</i> 11 <i>s.</i> $0\frac{4}{5}$ <i>d.</i> | (6) $83\frac{1}{3}$ qrs. | (10) $14\frac{39}{48}$; $12\frac{8}{9}$. |
| (3) 8 <i>s.</i> $2\frac{1}{4}$ <i>d.</i> | (7) Lose $8\frac{1}{3}$ per cent. | (11) 152 <i>l.</i> 1 <i>s.</i> 8 <i>d.</i> |
| (4) 256 days. | (8) Gain, $\frac{1}{8}$ per cent. | (12) 19 <i>s.</i> 6 <i>d.</i> |

PAPER VI.

- | | | |
|--|-------------------------------|-----------------------------|
| (1) 17 <i>s.</i> 6 <i>d.</i> | (5) 87 <i>l.</i> 10 <i>s.</i> | (9) 44 <i>l.</i> |
| (2) 271 <i>l.</i> 19 <i>s.</i> $2\frac{56}{365}$ <i>d.</i> | (6) 10 per cent. | (10) $1\frac{1}{45}$. |
| (3) 5. | (7) 285 <i>l.</i> | (11) 2 : 5. |
| (4) $5\frac{1}{4}$. | (8) 19. | (12) 640 $\frac{1}{2}$ qrs. |

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